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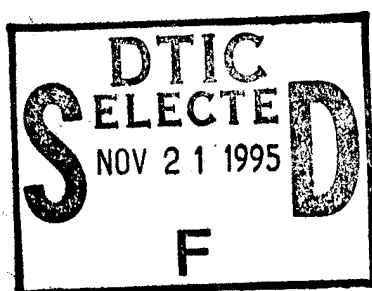
Based on Object-Oriented Technology:

Phase I of an ARPA STTR Program

March 23, 1995

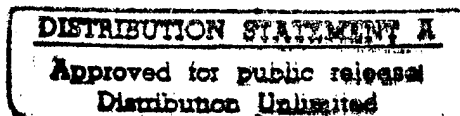Sponsored by **19951117 057**

Advanced Research Projects Agency (DOD)
Software and Intelligent Systems Office

Defense Small Business Technology Transfer Program

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This project builds upon our work on computer-based "associates," particularly in the design domain, resulting in commercial software for strategic planning and technological design. This base is enriched by Georgia Tech's "technology opportunities analysis" software that draws upon electronic information searching to profile and forecast R&D activities and trends.

The current project explored the nature of the ARPA PM's job to specify system functionality. This led to the identification of five main functions for the ARPA PMA: We then developed a prototype PMA using PowerBuilder. The prototype is a Windows application that interacts with conventional office applications, and demonstrates how the PM's five functions would be supported.

The PMA would also facilitate cross-program coordination by providing access to ARPA program information in structured, consistent ways. In addition, it provides a vehicle to help prepare new PMs to work in the ARPA environment.

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THE PROGRAM MANAGER'S ASSOCIATE

INTRODUCTION

OBJECTIVES

The purpose of this Small Business Technology Transfer Program (STTR) project is to define requirements for, design, and prototype a computer-based support system for R&D program managers (PMs). The long-range goal is to develop an architecture and set of tools with appeal to PMs independently of their organization (government, industry, academia) and domain (e.g., materials sciences or applied behavioral sciences; fundamental research or advanced development).

OVERVIEW

This report presents the final project status. First, we present our approach to determine PMA functional requirements. Next, we share our design for the PMA to support those requirements. Then, we indicate the specific support tools and briefly explore the potential of the PMA. This final report is accompanied by a demonstration of the PMA software.

APPROACH

Our approach to develop support system requirements involved three steps. First, we developed and administered an interview protocol to ARPA program managers that focused on the nature of their jobs, their information needs, and difficulties they may have experienced in becoming "ARPA-proficient" as new managers. Interviewees were Craig Wier and Bob Neches (two occasions each), and Pradeep Khosla (current PMs), and Robert Simpson and Steve Cross (former Pms). Mike Kelly also provided advice. Interviews lasted from 1 to 2.5 hours.

Next, we analyzed the results of these interviews, seeking difficulties and needs that were common across managers. This analysis led to a descriptive framework which we used to specify PMA functions. We also compared the difficulties and needs of ARPA PMs with those we identified using a similar approach among PMs at SEMATECH, the ARPA-sponsored R&D consortium for the semiconductor industry. We expected that similarities across these agencies would help us specify an adaptable, general R&D program manager's support system.

We then identified the support functions that would aid PMs and configured these into a system architecture based on object-oriented technology.

The intent was to devise a general application that would reside on the PM's desktop computer. It had to work with other applications that PMs currently use, yet also provide a

platform on which to grow. In particular, we perceive growth potential in intelligent aiding to help the PM access information from varied sources, interpret that information, and maintain control over it.

We then programmed a prototype PMA using Power Builder to demonstrate the overall application and many of its initial set of tools. The accompanying demonstration is sufficiently functional for ARPA to assess PMA's potential, suggest refinements, and determine whether continued development is in order.

FINDINGS

THE ARPA ENVIRONMENT

ARPA is the premier R&D organization for DoD. Its mission is to help maintain U.S. technological superiority over, and to prevent technological surprise by, its potential adversaries. The agency's goal is to pursue as many imaginative and innovative research ideas as budget and other constraints allow. Furthermore, with the change from DARPA to ARPA, there is a new emphasis on civilian needs, such as health care, and on transferring technology to the commercial sector. There is now pressure, as well, to evaluate R&D programs throughout the Federal government.

Relative to its mission, ARPA is not a large agency in terms of staff size. It employs about 180 people and has very few layers of management. Moreover, the tenure of the individual PM at ARPA typically lasts four or fewer years. These characteristics create a demanding job for the PM.

There are several contributing factors to note:

1. ARPA's mission requires the PM to identify and invest in technologies that possess enormous potential, but harbor significant risk of lost investment.

2. Each PM's "portfolio" of R&D investments tends to be large, representing a variety of technologies, requiring integration by the PM to realize full benefits.

3. Information must be gathered and integrated from diverse personal and other sources.

4. Rapid PM proficiency is critical due to the heavy responsibilities and short tenure; shortage of mentoring exacerbates this.

R&D PROGRAM MANAGER'S JOB

As Depicted in Figure 1, the Arpa Program Manager's Job Involves Four Major Responsibilities:
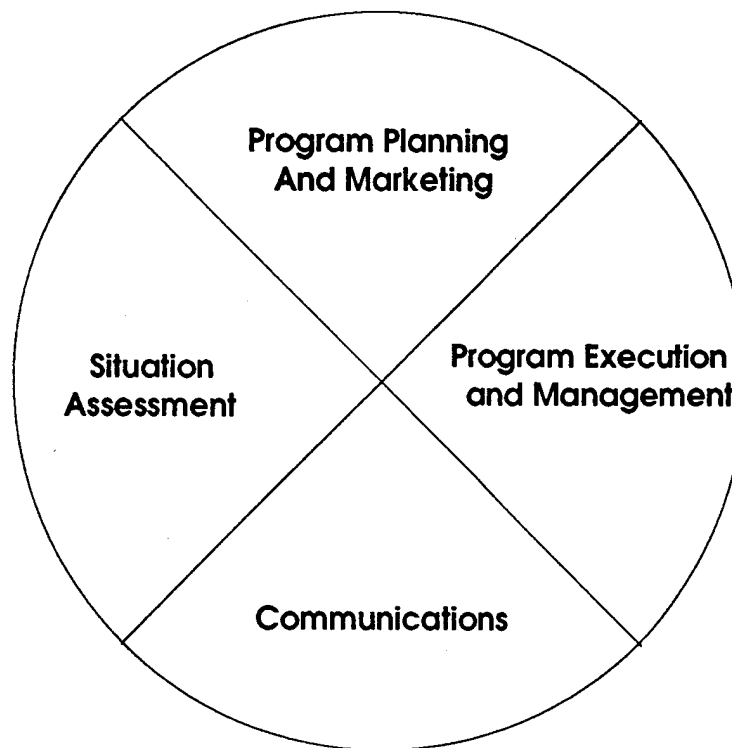
FIGURE 1. A BREAKDOWN OF THE R&D PROGRAM MANAGER'S JOB

Situation assessment refers to activities that keep the PM abreast of the current state and trends in two broad areas: (1) DoD and civilian needs; and (2) technological capabilities and trends that may pertain to the needs. One of the most important services that R&D PMs perform is the conceptual marriage of these needs and capabilities – "I see an application of this technology to the following operational problem...."

Managers keep abreast of needs and technology through a variety of channels. Regarding needs, broad direction comes from national goals for defense, education, manufacturing, etc., that are established by the White House, Congress, and the Secretary of Defense. More detailed agendas emerge from sponsors inside of DoD, the intelligence community, and other governmental agencies. At these levels, potential sponsors seek specific operational capabilities usually targeted at long-range plans. Needs emerge in briefings, policy statements, strategic planning documents, and descriptions of ongoing program. ARPA PMs also gain knowledge about needs when they receive feedback from other potential sponsors to proposed R&D programs.

Regarding technological capabilities and trends, interviewees said that they constantly scan the technology landscape for new, cutting edge developments. They do this mostly via in-person meetings, especially site visits to existing contractors, professional meetings and workshops. The interviewees also said that they keep in weekly and monthly touch with their principal

investigators (PIs). Due to ARPA's prominence, these PIs often include some of the world's leading authorities and researchers in a given domain. Indeed, more than one interviewee said that the breadth of the PI's knowledge of new technologies and his or her willingness to keep the PM informed about them was vital.

Another important channel for keeping up to speed about technology is via solicited and unsolicited proposals in which the latest technology and new ideas are presented. Technical updates from their own programs represent a third channel. Several managers said that the World Wide Web has also become a useful resource to them. Fourth is the technical and scientific literature, and electronic databases abstracting that literature. The ARPA PMs we spoke with said that they spent very little time searching for and reading abstracts and technical articles – basically, the channel is too inefficient.

Program planning and marketing include tasks that convert neat ideas into viable programs. The PM first works to envision a future operational state based on some technological innovation, and then tries to drum up enthusiasm for this future state among prospective sponsors. With the breadth of most ARPA programs, this work includes many different stakeholders. As a result, ARPA PMs said that they spend a great deal of time trying to gain endorsement for their program ideas, whether these ideas are brand new or significant expansions to existing work – thus, the use of the term "marketing" in this component of the R&D manager's job.

Planning entails judging the risks associated with a new technology and its likelihood of having genuine operational impact. It also involves decomposing a technology into its contributing components, and creating a program roadmap that allocates time and resources to component development. This activity entails lots of "what if" analyses as PMs try to balance resource needs and amounts of time to develop a technology with the interests of the operational community. Managers appear to have few tools to support these analyses and judgments.

Marketing involves persuasion – persuading sponsors to endorse the project from an operational perspective, and often persuading contractors to couch innovation in the correct operational terms. This requires many in-person presentations to potential sponsors, many of whom are in the DoD establishment, and to prospective contractors via BAA announcements and "road shows." These presentations focus on five key questions:

1. What is this proposed program attempting to accomplish (operational needs or opportunity)?

2. How are the needs that this program hopes to meet being met today?

3. What's new about the proposed approach/technology?

4. What are the criteria by which program success should be measured?

5. What are the resource requirements?

The PMs said that one of the most difficult planning and marketing tasks is conveying to contractors the "scorecard" by which research program outputs will be evaluated. Often

contractors appear insensitive to the operational needs of the ultimate sponsors and beneficiaries of their work, often focusing exclusively on the scientific or technological merits of their work. This motivational tension jeopardizes technology transfer into practice. One PM described his programs as "unfortunately, providing hothouses for orchids in the arctic. Take away the insulating properties of ARPA, and the contractor's outputs fail to thrive in the operational marketplace."

Marketing also involves keeping program stakeholders informed and enthused about the effort, a difficult task over the life and evolution of a program, especially in the very dynamic technological areas in which ARPA participates.

Finally, along with conceptual program planning, ARPA PMs spend a significant amount of time at the administrative effort of putting a new program in place. This involves finding contracting channels, preparing and managing formal documentation including briefing materials, RFIs and RFPs; collecting, managing and responding to proposals; writing SOWs, and so forth.

Program monitoring and management are dominated by management problem solving, coordinating, budget management, reporting to ARPA management and communicating with contractors. Most ARPA PMs manage many contracts simultaneously. Under these circumstances, they said that two tasks were most troublesome during program execution: finding out from contractors the true state of their progress, and managing the schedules, scopes and resources across all programs simultaneously.

In addition, the PMs find financial management of their programs to be a problem. ARPA's financial reporting system does not provide PMs with up-to-the-minute actual and accrued expenditures per expense category, per program. Instead, reports are delivered monthly, reflect invoiced and paid expenses, and do not reflect accrued work. Hence, PMs keep separate account information (e.g., in personally developed Excel spreadsheets), to track resource levels. Knowing the levels (allocated to the program, obligated but not spent, accrued and paid) is crucial when the manager must re-allocate monies based on technical progress, new opportunities, or changed constraints (e.g., a reduction in 6.1 funding). As a result, each PM said that a PM support system must integrate program planning with program execution, especially as regards resources. They also said that a system which reminds them about critical dates in the funding cycle (e.g., when funds had to be committed to avoid losing them in a sweep) would be very helpful.

Communications present an ongoing requirement to keep ARPA management, sponsors, contractors, and the broader technical and scientific communities informed about program progress. Since ARPA has very little resident administrative support, PMs spend a great deal of time trading messages with individuals in each of these groups. Hundreds of messages per PM may be traded per day, an enormous communications load that dominates the PM's time.

Preparing presentations for various purposes also consumes precious PM resources. Such preparations may entail searching for information (e.g., technical progress on one's projects, other

agency interests), collating information (e.g., as submitted by PIs; from earlier presentations), and preparing visual aids from these.

A final task category, that PMs said did not represent an unwieldy load, is administrative overhead. This includes preparing regular and "fire drill" reports regarding program status; doing financial forecasts and budgets; mentoring subordinates and less experienced managers; and contributing to planning and strategy committees.

THE NEW MANAGER

The typical ARPA PM is a technically sophisticated individual – industrial, academic or military officer – with more or less experience in the DoD R&D environment. A number of PMs are noted scientists and technologists in their right.

New PMs accept an assignment at ARPA for a variety of reasons – passion for a particular technology, the opportunity to do something very different, the attraction of high risk - high dollar programs, and others. Those who hold senior management positions in home companies take a risk that the position will evaporate when the ARPA assignment is over. However, those who depart with new managerial skills, a deep understanding of the Washington procurement game, and a broad base of contacts in the advanced technology domain are highly valued.

Assignments typically last four years or less. For PMs, the years decompose into three phases:

1. Becoming familiar enough with ARPA and the Washington, D.C. procurement venue to launch (or assume control of) a program;

2. Conducting the program that led to the assignment in the first place; and

3. Wrapping up or transferring program control, and preparing to return to the home organization or to a new opportunity.

The new PM often needs 6 to 12 months to become familiar with the process, and even more time to master it. Unfortunately, this duration is too long relative to the 2- to 3-year assignment and puts a great deal of time pressure on the PM to have significant accomplishments before having to wrap up and head home. While the phases may overlap, one key observation is that the knowledge and skills that PMs need to succeed in this environment are complex and cannot be learned and assimilated instantaneously. Thus, advance preparation may be helpful.

Upon arrival at ARPA, new PMs receive no formal "instruction" in how ARPA works or how to work ARPA. The fortunate new PMs are taken into a mentoring relationship, often with an individual who has been instrumental in attracting them to ARPA in the first place. In some cases, new PMs have managed only projects one or two orders of magnitude smaller (in terms of dollars) than those that they inherit or will initiate while at ARPA. Obviously, this carries a

variety of risks – financial risks of misspending significant resources and the risk of losing sponsors' interest if the program produces little of value.

In general, the PMs we spoke with said that the mentoring process work pretty well, but suffers from two key flaws. First, it is expensive. When mentoring begins to absorb a good deal of time, two people – the learner and the mentor – are tied up, which reduces overall productivity. An interesting metric that emerges in this regard, that could be used to judge the merit of a support system, is "reclamation of human resources." This refers to time devoted to mentoring, a measure that an activity-based cost accounting system could be used to calculate, i.e., distribution of managers' time with or without a support system.

Second, informal mentoring has no quality control mechanism. The system cannot easily ensure that different mentors teach different new managers similar "survival skills," approaches, values, etc. Moreover, each new mentor-manager pair provides another opportunity for mutation in ARPA's operating procedures. Not that this is inherently bad, but it does make for inefficient use of a PM's time to invent procedures to get programs accomplished.

Clearly, ARPA would like to have new PMs behave like seasoned managers right from the start, and to invest the minimum resources to attain this goal. The knowledge and skills that managers need, however, are complex and cannot be learned instantaneously. New managers must quickly take up responsibility for a program, sometimes one that is already in progress. Since SOPs at ARPA are relatively limited, once involved in a program, PMs depend a great deal on being coached by other program managers. There seems to be good cooperation among PMs in this regard. However, the logistics of this arrangement may provide significant opportunities to improve productivity, lower risks and increase program quality.

A FRAMEWORK FOR AIDING THE R&D MANAGER

OVERALL SYSTEM GOALS

Based on the above insights into the ARPA PM's job, we identified five goals that should guide development of a PM's support system.

1. Enhanced program productivity with greater adoption of ARPA project outputs in DoD and civilian enterprises.

2. Predictable, well-controlled and repeatable program management process, independent of program manager (i.e., experienced or new), area (SSTO, ESTO, etc.), and type of project.

3. Reduced complexity of the manager's job to improve productivity and reduce learning requirements.

4. Enhanced performance by the manager in both technical and administrative tasks.

5. Ability to bring new managers up to speed more rapidly and at lower cost.

We are convinced that a PMA can help ARPA progress toward these goals. Such a computer-based support system. The following sections describe our structure for a PMA.

To have broad commercial appeal, similar benefits should accrue to R&D managers in enterprises other than ARPA. These include other government agencies (e.g., DoD, DoE, DoT, etc.), R&D consortia (e.g., SEMATECH, MCC), industrial laboratories, and university labs. Based on the number of such institutions (thousands) and R&D planners per institution (tens to hundreds) who might benefit from a PM support system, a conservative estimate of the potential market for such a system is on the order of 100,000 units.

A FRAMEWORK FOR R&D

Figure 2 depicts an idealized process view of the PM's major tasks. Ellipses indicate the major steps and the other elements in the figure indicate inputs and outputs of these steps. Briefly, in needs definition, the PM interacts with potential technology users to develop a clear understanding of what they will value and in what time frame. This output is expressed as a set of relationships between attribute changes (e.g., speed, maintainability, etc.), value, and time.

Technology mapping uses the characterization of customer desires along with technology monitoring, forecasts and assessments to produce alternative technological approaches (A, B, C...). These approaches harbor various levels of risk. To determine these risks more accurately, the PM decomposes each potential solution into its component requirements (tree structure), and measures or estimates risk at the component level. Risk is assessed along several dimensions including the market, scientific/technological, realization (manufacturing) and organizational tool.

Program roadmap construction allows the PM to explore benefit/risk tradeoffs by comparing alternative sets of projects, resource levels, and temporal orderings. PMA will offer computational support to facilitate "what if" analyses. It will enable the PM to visualize alternative formulations in terms of resources, time required, and relative risks. PMA also allows the PM to weave in recognition of R&D efforts being supported by other ARPA and outside groups to leverage their advances and buttress prospects for success should certain components not succeed.

PMA supports program management via two important applications – presentation preparation and program execution and management. One of the key features of PMA is its combination of program planning with program execution. Presentation preparation helps the PM generate and present persuasive materials to communicate with various audiences (e.g., potential sponsors and supporters). As part of PMA this gains in accessing the other components, such as the program roadmap to show how component projects fit with each other and with others' R&D. Most practically, it will facilitate access to and reuse of information as the PM tailors particular presentations.

Program execution and management will likely account for most of the day-to-day use of PMA. It helps the PM accomplish project portfolio management by supporting information gathering (e.g., orchestrating e-mail queries to one's PIs; compiling information semiautomatically from PI home pages), scheduling (e.g., calendar tracking of project milestones; meeting scheduling), budgeting (e.g., tracking program expenditures; facilitating reallocations), and evaluation (e.g., recording milestone accomplishments and relating these to program and national goals).
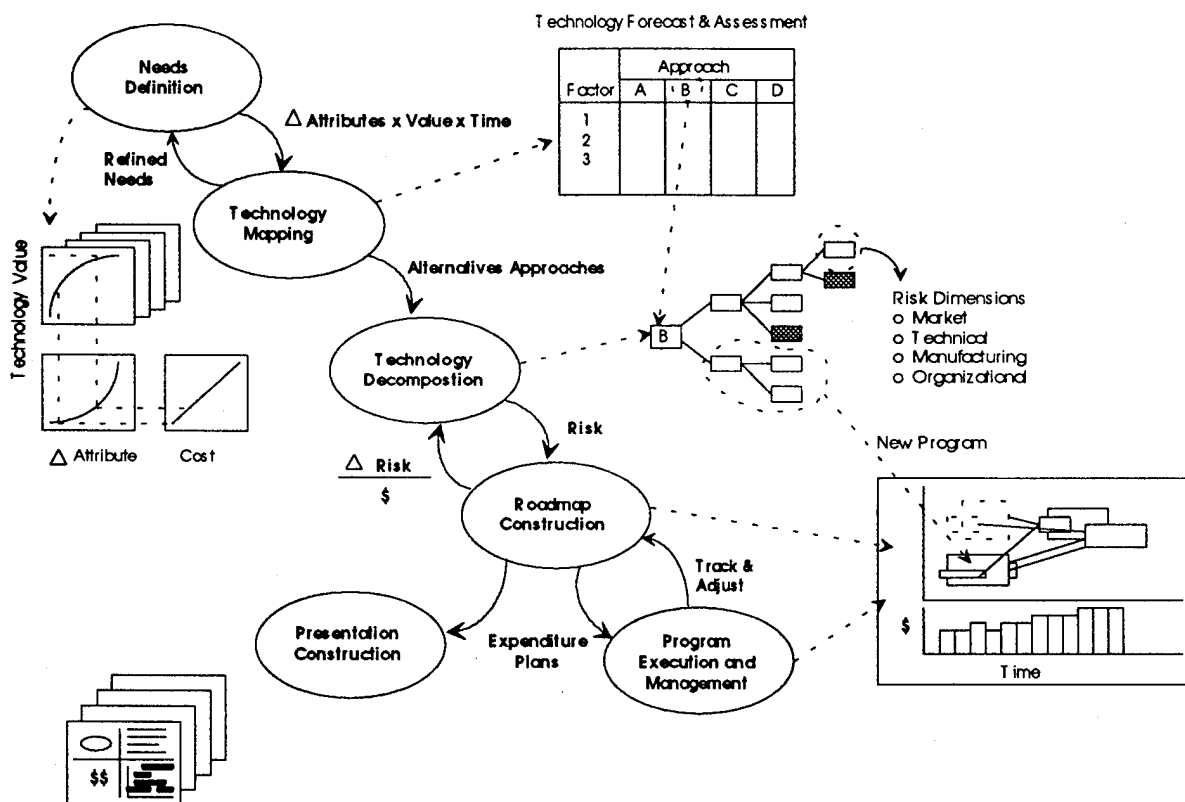

FIGURE 2. A FRAMEWORK FOR TECHNOLOGY DEVELOPMENT

SUPPORT REQUIREMENTS

Figure 2 depicts the overall PMA framework. Table 1 lists specific tasks and corresponding PMA tools to assist in the accomplishment of those tasks. We briefly summarize these here.

Table 1 organizes PM tasks into the five main functions addressed by PMA (cf., previous section and Figure 2). We conceive of the PM shifting emphases among these as his or her program matures. In program development, emphasis will be on planning, involving Functions 1-4. During program management, Functions 3-5 will likely predominate. We envision creating specific cases that play out across these functions to help new PMs familiarize themselves with ARPA.

11

Table 1, Column 1, lists a number of tasks within the five Functions. In Column 2, it lists specific tools. Tools do not neatly map one-to-one against either tasks or functions, but are grouped by the functions they most directly serve. The demonstration PMA shows how these tools will operate.

TABLE 1. FUNCTIONAL REQUIREMENTS FOR THE PROGRAM MANAGER'S ASSOCIATE (PMA)

Functions/Tasks:		Tools:
1.	*Needs Identification and Prioritization*	
	• needs stimulation • cross-program information sharing • supporting ARPA Director program coordination • providing rationale for support from multiple sources • stakeholder identification and coordination	• technology updates • planning tools • attributes X Values X Time analyses (changes propagate among these) • stakeholder management
2.	*Technology Mapping*	
	• technology forecasting and assessment • synthesis of needs and technology requirements	• 'find out about' agents • technology opportunities analysis • technology forecasting • technology X needs analyses
3.	*Technology Decomposition*	
	• depicting technological dependencies • depicting probabilities of attainment and payoffs • characterizing resource and time requirements	• tree diagrams • technology assessment analyses
4.	*Program Roadmap*	
	• graphical depiction of project relationships • capability to perform "what if" analyses • program evaluation support	• visual spreadsheet • graphical benefit/risk metrics • object oriented embedded information • Wizard
5.	*Program Management*	
	• contracting support • proposal evaluation support • project budgeting (with 'what if' capabilities) • project tracking (milestone alerting) • communication support • schedule management • portfolio assessment • interact with the roadmap • financials	• financial management tool • project status tracker • calendaring agent • document preparation support • evaluation support • communicator

Tools especially serving needs assessment include:

- technology updates – compiling program achievements with external information acquisition (using the "find out about" tools) to provide news to potential sponsors, users, and PIs; serving to increase awareness of and stimulate interest in ARPA program interests by providing updates to a contacts list electronically

- planning tools – tailoring Search Technology's commercial software packages' (Business Planning Advisor and Product Planning Advisor) capabilities to the PM''s domain of interests

- attributes X values X time analyses – providing computational support to investigate tradeoffs among program elements, and plots to communicate the intended program payoffs

- stakeholder management – underlying PMA will be several relational databases (e.g., stakeholders, technologies) with tools to ease recall of information according to PM-selected markers; for instance, the PM can establish specialty networks of contacts who share interests in certain technologies

Tools designed particularly for technology mapping include:

- "FOA" agents – intelligent information retrieval to 'find out about' topics of interest by searching internal and public databases, the World Wide Web, etc.

- technology opportunities analysis – programs that summarize and graph FOA information to help track emerging technologies and potential applications

- technology forecasting – additional tools to facilitate situation assessment and projection

- technology X needs analyses – means to map functional needs into technological requirements

Tools for technology decomposition:

- tree diagrams – to compare R&D options graphically

- technology assessment analyses – attendant analyses framed to provide multiple perspectives (e.g., value comparisons, technical feasibility vs. risk assessments, market comparisons)

Tools for program roadmapping:

- visual spreadsheet – allowing easy "big picture" comparisons for program design (and also project tracking)

- graphical benefit/risk metrics – as spreadsheet entries are changed, plots and meters reflect the budgetary and risk-reduction implications over time

- object oriented embedded information – "information at the PM's fingertips" – 'pointing and clicking' on entries calls up more detailed information [e.g., opening a project gets to project summary information; further opening gets to contact information (e.g., PI's e-mail)];

- Wizard provides help at different levels – simple PMA features help; substantive advice cumulated over related ARPA experience.

Tools for program management:

- financial management tool – with spreadsheet and graphical budgeting capabilities enabling various analyses, with cross-application information updating

- project status tracker: means to determine contractors' technical and budget status

- calendaring agent

- document preparation support: support for construction of RFIs, RFPs, SOW,s and contracts

- evaluation support: system to facilitate proposals and to support program evaluation

- presentation Wizard: tool to help build customized presentations drawing upon the PM's archive of graphics, demonstrations, etc., utilizing standard presentation graphics package(s)

APPLICATION

The PMA tools interlink to serve multiple PM functional needs. A premise of the design of the PMA is that an application that integrates these tools with each other and with standard software supports (e.g., word processing, calendaring, spreadsheets, presentation graphics) will boost PM effectiveness.

The PM manager is the hub of a large number of information flows. These flows involve different types of artifacts, are more and less active as a function of project stage, and exhibit different volumes, predictability, and priority. "Artifacts" that move along these channels refer to myriad reports, presentations, teleconferences, and e-mail that keep people informed.

Despite the heavy use of e-mail, the PM spends a lot of time interacting in person with people. Similarly, since feedback on mission-critical items, like equipment purchases, supplier invoices, etc., is not automatic, the manager must expand the network once the project is underway. Artifacts are exchanged in paper form and get lost from time to time. They may also need to pass

through several hands (links not shown in Figure 2) and can become stalled along the way. When this occurs, the manager must trace the causes by contacting people along the chain.

The manager may need help creating and sending original reports, but may need more help in reusing information to service different channels or the same channel over time. All managers said that they spend too much time producing minor variations of similar reports for different people. For instance, presentation vugraphs of similar information, but different format, are used for presentation to several groups. Each set has a relatively short life, yet consumes much time to produce.

Figure 2 helps to explain why new assignees have difficulty becoming effective – too many undocumented channels. The new manager must learn the identity of each channel, how to manage its idiosyncratic flow, why it is important, its authority, what other areas link to it, etc. The manager acquires some of this knowledge from peers and managers. He or she learns more about how the system works when, unfortunately, information gets lost or stalled and must be sleuthed down. The PMA offers special promise as a mechanism to enrich and hasten PM learning about the job and proficiency at it.

Figure 3 portrays the general PMA architecture. PMA is presently designed as a Windows application. One option is to build it using authoring systems that enable easy porting to Unix and Macintosh environments. Within Windows, PMA appears as a discrete application. It uses a recognizable interface format with its arrays of tools. Underlying PMA are specific objects with appropriate functionality associated (e.g., project objects are illustrated in Figure 4). PMA includes protocols to access other databases (to obtain information such as ARPA formats for statements of work, illustrated). Full application of PMA would entail coordination among key information sources (e.g., accounting) to assure access when needed. Lastly, note that PMA works with standard software, such as Microsoft Office, to produce particular outputs. Document templates facilitate common format within ARPA and make use of spreadsheets, etc., easier.

DEVELOPMENT STRATEGY

Further development depends upon continued support. Phase II STTR support would enable development of an operational, basic PMA. This should be seen as the next step in developing a more advanced PMA. The basic PMA will be developed in accord with Figures 2-4 and Table 1. The first stage would be to seek feedback on most desired features and requirements for adoption by showing the demonstration to a wide spectrum of ARPA Pms. The second stage will be to determine system development parameters (e.g., whether it should operate under multiple systems). Then the basic PMA engine will be prepared. Fourth, specific tools will be constructed (cf., Table 1). We anticipate that functional versions of nearly all the tools listed in Table 1 should be available by the completion of Phase II.

Development beyond Phase II will first entail improvement for ARPA based on feedback from lead users. Then it will involve functional improvement of the tools (e.g., increasing the intelligence of the search mechanisms, increasing options within the tools, offering support for

links to other software applications). One of the most exciting dimensions will be to enhance the learning capabilities of PMA so that it can adapt to the needs of individual Pms and improve its performance for each PM with practice.

We also keep in mind that an objective of this STTR program is commercialization. We will continue to work to develop versions of PMA suited to R&D managers outside ARPA.
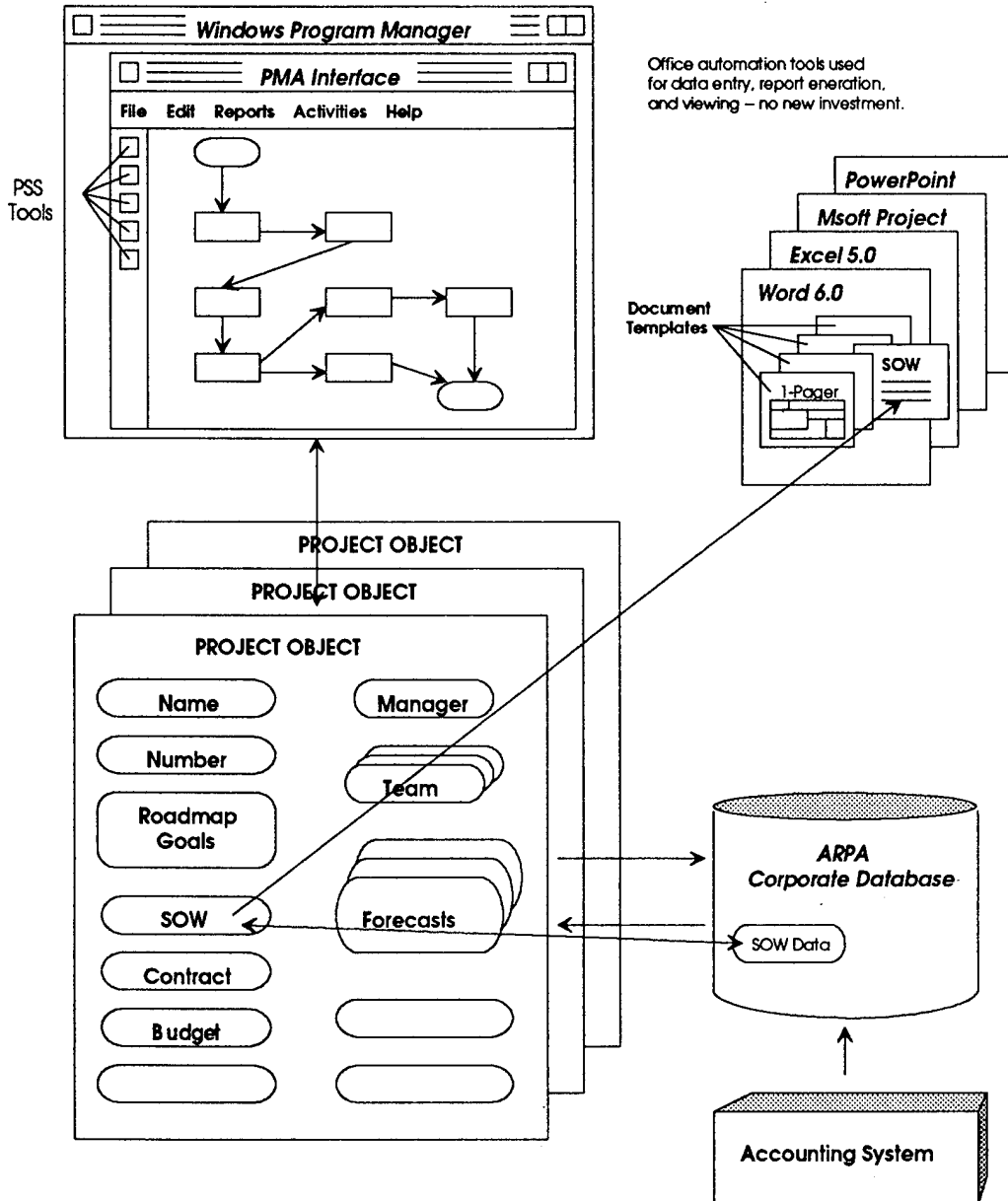

FIGURE 3. AN OBJECT-BASED ARCHITECTURE FOR PMA THAT USES STANDARD OFFICE SOFTWARE TO AUTHOR AND VIEW THE OBJECT DATA

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